

speed of the engines, following the inflight shutdown of all engines, is insufficient to provide the necessary electrical power for engine ignition, a power source independent of the engine-driven electrical power generating system must be provided to permit inflight engine ignition for restarting.

(f) *Auxiliary Power Unit.* Each auxiliary power unit must be approved or meet the requirements of the category for its intended use.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25-23, 35 FR 5676, Apr. 8, 1970; Amdt. 25-40, 42 FR 15042, Mar. 17, 1977; Amdt. 25-57, 49 FR 6848, Feb. 23, 1984; Amdt. 25-72, 55 FR 29784, July 20, 1990; Amdt. 25-73, 55 FR 32861, Aug. 10, 1990; Amdt. 25-94, 63 FR 8848, Feb. 23, 1998; Amdt. 25-95, 63 FR 14798, Mar. 26, 1998; Amdt. 25-100, 65 FR 55854, Sept. 14, 2000]

EFFECTIVE DATE NOTE: At 79 FR 65526, Nov. 4, 2014, § 25.903 was amended by adding a new paragraph (a)(3), effective Jan. 5, 2015. For the convenience of the user, the added text is set forth as follows:

§ 25.903 Engines.

(a) * * *

(3) Each turbine engine must comply with one of the following paragraphs:

(i) Section 33.68 of this chapter in effect on January 5, 2015, or as subsequently amended; or

(ii) Section 33.68 of this chapter in effect on February 23, 1984, or as subsequently amended before January 5, 2015, unless that engine's ice accumulation service history has resulted in an unsafe condition; or

(iii) Section 33.68 of this chapter in effect on October 1, 1974, or as subsequently amended prior to February 23, 1984, unless that engine's ice accumulation service history has resulted in an unsafe condition; or

(iv) Be shown to have an ice accumulation service history in similar installation locations which has not resulted in any unsafe conditions.

* * * * *

§ 25.904 Automatic takeoff thrust control system (ATTCS).

Each applicant seeking approval for installation of an engine power control system that automatically resets the power or thrust on the operating engine(s) when any engine fails during the takeoff must comply with the requirements of appendix I of this part.

[Amdt. 25-62, 52 FR 43156, Nov. 9, 1987]

§ 25.905 Propellers.

(a) Each propeller must have a type certificate.

(b) Engine power and propeller shaft rotational speed may not exceed the limits for which the propeller is certificated.

(c) The propeller blade pitch control system must meet the requirements of §§ 35.21, 35.23, 35.42 and 35.43 of this chapter.

(d) Design precautions must be taken to minimize the hazards to the airplane in the event a propeller blade fails or is released by a hub failure. The hazards which must be considered include damage to structure and vital systems due to impact of a failed or released blade and the unbalance created by such failure or release.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25-54, 45 FR 60173, Sept. 11, 1980; Amdt. 25-57, 49 FR 6848, Feb. 23, 1984; Amdt. 25-72, 55 FR 29784, July 20, 1990; Amdt. 25-126, 73 FR 63345, Oct. 24, 2008]

§ 25.907 Propeller vibration and fatigue.

This section does not apply to fixed-pitch wood propellers of conventional design.

(a) The applicant must determine the magnitude of the propeller vibration stresses or loads, including any stress peaks and resonant conditions, throughout the operational envelope of the airplane by either:

(1) Measurement of stresses or loads through direct testing or analysis based on direct testing of the propeller on the airplane and engine installation for which approval is sought; or

(2) Comparison of the propeller to similar propellers installed on similar airplane installations for which these measurements have been made.

(b) The applicant must demonstrate by tests, analysis based on tests, or previous experience on similar designs that the propeller does not experience harmful effects of flutter throughout the operational envelope of the airplane.

(c) The applicant must perform an evaluation of the propeller to show that failure due to fatigue will be avoided throughout the operational life of the propeller using the fatigue and structural data obtained in accordance

§ 25.925

with part 35 of this chapter and the vibration data obtained from compliance with paragraph (a) of this section. For the purpose of this paragraph, the propeller includes the hub, blades, blade retention component and any other propeller component whose failure due to fatigue could be catastrophic to the airplane. This evaluation must include:

(1) The intended loading spectra including all reasonably foreseeable propeller vibration and cyclic load patterns, identified emergency conditions, allowable overspeeds and overtorques, and the effects of temperatures and humidity expected in service.

(2) The effects of airplane and propeller operating and airworthiness limitations.

[Amdt. 25-126, 73 FR 63345, Oct. 24, 2008]

§ 25.925 Propeller clearance.

Unless smaller clearances are substantiated, propeller clearances with the airplane at maximum weight, with the most adverse center of gravity, and with the propeller in the most adverse pitch position, may not be less than the following:

(a) *Ground clearance.* There must be a clearance of at least seven inches (for each airplane with nose wheel landing gear) or nine inches (for each airplane with tail wheel landing gear) between each propeller and the ground with the landing gear statically deflected and in the level takeoff, or taxiing attitude, whichever is most critical. In addition, there must be positive clearance between the propeller and the ground when in the level takeoff attitude with the critical tire(s) completely deflated and the corresponding landing gear strut bottomed.

(b) *Water clearance.* There must be a clearance of at least 18 inches between each propeller and the water, unless compliance with § 25.239(a) can be shown with a lesser clearance.

(c) *Structural clearance.* There must be—

(1) At least one inch radial clearance between the blade tips and the airplane structure, plus any additional radial clearance necessary to prevent harmful vibration;

(2) At least one-half inch longitudinal clearance between the propeller blades

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or cuffs and stationary parts of the airplane; and

(3) Positive clearance between other rotating parts of the propeller or spinner and stationary parts of the airplane.

[Doc. No. 5066, 29 FR 18291, Dec. 24, 1964, as amended by Amdt. 25-72, 55 FR 29784, July 20, 1990]

§ 25.929 Propeller deicing.

(a) For airplanes intended for use where icing may be expected, there must be a means to prevent or remove hazardous ice accumulation on propellers or on accessories where ice accumulation would jeopardize engine performance.

(b) If combustible fluid is used for propeller deicing, §§ 25.1181 through 25.1185 and 25.1189 apply.

EFFECTIVE DATE NOTE: At 79 FR 65526, Nov. 4, 2014, § 25.929 was amended by revising paragraph (a), effective Jan. 5, 2015. For the convenience of the user, the revised text is set forth as follows:

§ 25.929 Propeller deicing.

(a) If certification for flight in icing is sought there must be a means to prevent or remove hazardous ice accumulations that could form in the icing conditions defined in Appendix C of this part and in the portions of Appendix O of this part for which the airplane is approved for flight on propellers or on accessories where ice accumulation would jeopardize engine performance.

* * * * *

§ 25.933 Reversing systems.

(a) For turbojet reversing systems—

(1) Each system intended for ground operation only must be designed so that during any reversal in flight the engine will produce no more than flight idle thrust. In addition, it must be shown by analysis or test, or both, that—

(i) Each operable reverser can be restored to the forward thrust position; and

(ii) The airplane is capable of continued safe flight and landing under any possible position of the thrust reverser.

(2) Each system intended for inflight use must be designed so that no unsafe condition will result during normal operation of the system, or from any failure (or reasonably likely combination